

WE CLAIM:

1. A monitor unit for monitoring light within a wavelength range and propagating within an optical fiber, the unit comprising:
 - an input port;
 - a focusing unit;
 - a filter unit, the input port and focusing unit being disposed on a first side of the filter unit, light from the input port passing through the focusing unit to the filter unit; and
 - a photodetector unit disposed on a second side of the filter unit, to receive light transmitted through the filter unit, the photodetector unit having at least one photodetector element having a detector spectral response over the wavelength range, the filter unit having a spectral transmission characteristic selected to at least partially compensate for non-uniformity in the detector spectral response so that a monitor spectral response over the wavelength range is more uniform than the detector spectral response.
2. A monitor unit as recited in claim 1, wherein the monitor spectral response is flat to within $\pm 3\%$ over the wavelength range of 100 nm.
3. A monitor unit as recited in claim 1, wherein the wavelength range includes 1.55 μm .
4. A monitor unit as recited in claim 1, wherein the filter includes a multilayer reflective coating having alternating layers of TiO_2 and SiO_2 .
5. A monitor unit as recited in claim 4, wherein more than 75% of the layers have an optical thickness of approximately one quarter wave at a predetermined design wavelength.

6. A monitor unit as recited in claim 1, wherein the filter includes a multilayer reflective coating having no more than thirteen layers and the monitor spectral response is flat to within $\pm 3\%$ over the wavelength range of 100 nm.

7. A monitor unit as recited in claim 1, wherein the photodetector unit is disposed to receive the light transmitted through the filter unit directly.

8. A monitor unit as recited in claim 1, further comprising a wavelength selection unit disposed between the filter unit and the photodetector unit, the wavelength selection unit receiving the light transmitted through the filter unit and separating light at different channel wavelengths into separate channel beams.

9. A monitor unit as recited in claim 8, wherein the photodetector unit includes an array of photodetectors disposed to detect respective separate channel beams.

10. A monitor unit as recited in claim 1, wherein the input port is an end of the optical fiber.

11. A monitor unit as recited in claim 10, further comprising another optical fiber, light from the first port reflected by the filter unit being focused into an end of the other optical fiber by the focusing unit.

12. A monitor unit as recited in claim 1, wherein the focusing unit has an optical axis, light propagating from the first port to the filter unit being substantially collimated between the focusing unit and the filter unit and propagating in a direction non-parallel to the optical axis.

13. A monitor unit as recited in claim 12, wherein the light transmitted through the filter unit propagate in a direction substantially parallel to the optical axis.

14. An optical system, comprising:

an optical transmitter producing output light;

an optical receiver receiving at least a portion of the output light;

and

an optical fiber link coupling between the optical transmitter and the optical receiver, the optical fiber link including a monitor unit having:

an input port coupled to receive light from the optical fiber link;

a focusing unit;

a filter unit, the input port and focusing unit being disposed on a first side of the filter unit, light from the input port passing through the focusing unit to the filter unit; and

a photodetector unit disposed on a second side of the filter unit, to receive light transmitted through the filter unit, the photodetector unit having at least one photodetector element having a detector spectral response over the wavelength range, the filter unit having a spectral transmission characteristic selected to at least partially compensate for non-uniformity in the detector spectral response so that a monitor spectral response over the wavelength range is more uniform than the detector spectral response.

15. A system as recited in claim 14, further comprising one or more optical amplifier units disposed on the optical fiber link between the optical transmitter and the optical receiver.

16. A system as recited in claim 14, wherein the optical transmitter includes modulated light sources operating at different wavelengths and optical combining elements to combine outputs from the modulated light sources into a fiber output coupled to the optical fiber link.

17. A system as recited in claim 14, wherein the optical receiver includes optical separating elements to separate different wavelengths of light received from the optical fiber link and to direct light at different wavelengths to respective detectors.

18. A system as recited in claim 14, further comprising an optical add/drop multiplexer disposed on the optical fiber link, the optical add/drop multiplexer being coupled to another optical fiber system.

19. A method of monitoring light within a wavelength range propagating along an optical fiber, comprising:

transmitting the light from the fiber through a focusing unit to form a substantially collimated beam propagating towards a filter unit having a filter spectral transmission characteristic;

transmitting a portion of the substantially collimated beam through the filter unit; and

detecting the transmitted portion of the substantially collimated beam with a photodetector having a detector spectral response, the filter spectral transmission characteristic being selected to reduce non-uniformities in the detector spectral response over the wavelength range.

20. A method as recited in claim 19, wherein the wavelength range includes 1.55 μm .

21. A method as recited in claim 19, wherein detecting the transmitted portion includes detecting the transmitted portion directly from the filter unit.

22. A method as recited in claim 19, further comprising separating light of different channel wavelengths into separate beams and detecting the transmitted portion includes detecting the light in the different channel wavelengths individually

23. A method as recited in claim 19, further comprising reflecting light from the filter unit to another fiber.

24. A method as recited in claim 19, wherein the focusing unit has an optical axis, light propagating from the first port to the filter unit being substantially collimated between the focusing unit and the filter unit and propagating in a direction non-parallel to the optical axis.

25. A monitor unit as recited in claim 12, wherein the substantially collimated beam propagates towards the filter unit in a direction non-parallel to an optical axis of the focusing unit, and wherein the transmitted portion of the substantially collimated beam propagates from the filter unit in a direction substantially parallel to the optical axis.

26. A device for monitoring light within a wavelength range propagating along an optical fiber, comprising:

- means for transmitting the light from the fiber through a means for focusing to form a substantially collimated beam propagating towards a means for filtering having a filter spectral transmission characteristic;

- means for transmitting a portion of the substantially collimated beam through the means for filtering; and

- means for detecting the transmitted portion of the substantially collimated beam a detector spectral response, the filter spectral transmission characteristic being selected to reduce non-uniformities in the detector spectral response over the wavelength range.